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ABSTRACT

On the basis of two sets of videotaped observations collected on same-sex, same-age and mixed-age dyads composed of children 18 and/or 24 months old, issues concerning research on infants and toddlers are addressed. The first set of observations was a simple description of the structure and content of children's peer interaction during 15 minutes of free play. Questions addressed focused on: (1) the contribution of age-related mechanisms to the growth of peer skill over the latter part of the second year; and (2) children's social accommodations to a partner differing in age. The second set of observations focused on toddlers in cooperative problem solving situations. Research issues addressed, in a somewhat preliminary way, include the need for a more detailed and elaborate data base of research on infants and toddlers, the need to examine in much more detail the contexts in which particular peer competencies are manifested, the need to study the social understanding the child brings to peer interaction, and the need to build and test explanatory models for the early acquisition and growth of peer social skills. (RH)

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EFFECTS OF AGE AND AGE-MIX ON TODDLER PEER INTERACTION

and

DEVELOPMENT OF ROLE-TAKING ABILITY IN TODDLERS

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Not terribly long ago, it would have been unusual to participate in a session devoted entirely to infant-toddler peer relations, becuase it wasn't long ago that we still conceived of infants and toddlers as primarily asocial with their peers. However, in the last decade, and particularly in the last 5 years or so, the baby has come a long way, so to speak. Not only do we now think of infants as perceptually and cognitively competent, but we are now very much aware of their social competencies as well, both within and outside of the parent-infant system. It has gradually become recognized that the adaptive requirements of our species may include demands from the peer environment early-on, as well as those from the parent-child network.

As the papers in this session illustrate, our task is no longer to show that infants and toddlers are socially competent with their peers, but to detail the nature of those competencies. A handful of pioneering investigators (some of them on this panel) began a few years ago to enrich our descriptive data base with respect to infant/toddler peer relations, and even began to provide us with some theoretical insights regarding the possible sources of early peer skills. That effort has really only just begun, however. There are several tasks still ahead of us. I would classify those into 4 main slots. First, the data base needs still more detail and elaboration, particularly as regards the <u>earliest</u> emergence of peer skills, and how those skills change with age. Second, as several writers have now noted, we need to examine in much more detail the <u>contexts</u> in which particular peer competencies are manifested; that is, we need answers to questions about how social and physical-world circumstances affect children's peer interactions--what aspects of the physical and social environment are infants and toddlers differentiall socially responsive to? Third, we don't yet know very much about young children's <u>social-cognitive skills</u> as those affect social behavior. So, for starters we need to focus some attention on the social understanding the child brings to peer interaction; that includes self-knowledge & awareness, understanding of causal relations

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between self and other, understanding of social roles, metacommunicative skills, and so forth. Finally, our data base is coming to the point where we can begin to build and test explanatory models for the early acquisition and growth of peer social skills. Efforts up to now have been largely atheoretical and descriptive--as well they should have been, given the relatively uncharted territory they were adventuring into. However, on the basis of the growing interest in infant-toddler competencies in general, we are beginning to encounter some suggestive convergent developments across several domains, including peer skills; these convergences may provide a foundation for constructing an explanatory framework for our data.

I would like to speak to each of these briefly and in a still somewhat preliminary way, on the basis of 2 sets of observations collected on 18 and 24 month old children. Both sets of observations were collected on dyads. 64 children were assigned to same age dyads composed of 2 18-month olds, or 2 24-month olds, or to mixed-age dyads, composed of an 18-month and a 24-month old. Dyads were same sex, and all the children were familiar with one another, and all had been in daily group care for equivalent lengths of time, approx. 4 to 6 months. Dyads were then observed and videotaped in free play and in a cooperative problem solving setting. These two sets of observations were motivated by different questions, so I will present them each separately.

The first set of observations was a simple description of the structure and content of children's peer interaction during 15 mins of free play. Although there are many questions to which these kinds of observations might be addressed, I was interested in 2 in particular. One had to do with the contribution of age-related mechanisms to the growth of peer skill over the latter part of the second year--that period when we see rather profound cognitive transitions as well. And the other questions had to do with children's social accommodations to a different aged partner over this age range.

The first question actually derived from the findings of several investigators

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regarding the role of peer experience in the acquisition of peer social skill. These investigators have suggested that experience with peers qua peers contributes uniquely to the growth of peer skills---in other words, that that sort of contribution is different from both more general social experience (such as parent-infant interaction) and from other age-related contributions. It was this second facet that the free play observations were directed to. That question had been asked previously by comparing the acquisition of peer skills in children with and without peer experience--when children of the same age, but with different amounts of peer experience, have been compared it has usually been found that the experienced children are more advanced than the nonexperienced ones, and that, over time, peer experience contributes as much or more to the growth of interactional skills as do age-related changes. Now, another, complementary way to ask this question is to compare children of different ages but with equivalent peer experience. If differences were found for this comparison, that would implicate some sort of specifically age-related mechanism above and beyond whatever peer experience provided. So one thing I was looking for in the free play observations was whether age differences existed for either the structure or content of the children's peer interaction, given that the children were equivalently peer experienced.

The second question the free play observations were directed to concerned toddlers' ability to modify their social behavior with a different aged partner. This is part of the larger question of social context effects on peer interaction--that is, how children adapt their performance to different situational demands. We have some information already about the effects of context variables such as presence of toys, group size, presence of adults, and so on. We don't know so much, however, about partner effects on the very young child's peer interaction. We know from the work of Shatz & Gelman and others that preschool children will differentially accommodate their social and communicative behavior as a function of age of partner. And among toddlers we know that familiarity of the peer partner

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makes a difference in the nature of social contact, and in slightly older children (33 mos), that partner gender makes a difference. But there has been no systematic look at the effects of partner age on the very young child's peer directed behavior. There are at least a couple of reasons why this question should be of interest. First, it's sort of a competence-performance kind of question. That is, our inferences about social competence are derived from the child's performance under particular conditions. It may well be that we see a different level or quality of performance with a different aged partner than with a same age peer. In particular, it would be interesting to know whether the younger child in mixed age interaction performed at more advanced levels. Another reason for interest in this question of partner age is more social-cognitive in nature. It's the sort of question that Shatz & Gelman asked, or Wellman & Lempers--namely, to what extent older children seem to be aware of the limitations in a younger partner's skills, and actively compensate for or accommodate to the younger partner's skill level. So it was with these questions in mind that 18 and 24 month olds were observed in mixed age interaction during free play.

The procedure for the free play session was fairly straightforward. Children were taken to a familiar room at their day care center, with a familiar adult. There they were simply left to their own devices and videotaped. A standard set of toys was provided each dyad. These had been chosen on an a priori basis to allow individual play, cooperative play, or either kind of play. For example, two toy phones hooked together with a cord encouraged cooperative play, while a carpenter's bench with one hammer allowed only one child to play, and large plastic slinky could be used for either type of play. All peer directed behavior was later transcribed and coded from the videotapes, using two fairly fine-grained observation schemes adapted from the existing literature. One focused on the content of the children's interactions, and was exhaustive of the children's social behavior at this age. It included behaviors such as vocalization, gesture, give/take/show toys, imitation, and so forth. The second scheme focused on the

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structure of the interactions, i.e., those characteristics that were independent of content. Structure could include things like who initiated and terminated the interaction. It also included measures of exchange length and overture length. Exchange length referes to the number of partner turns or rounds in a social exchange. For example if child A initiates, B responds, and A responds back, that would be a 3-turn exchange. Overture length refers to the number of discrete behaviors in a social overture, where a social overture is an initiation to the partner or a response to the partner's initiation. So if a child vocalized and gestured to the peer, that overture would be 2 behaviors long; if a child vocalized, gestured, and offered a toy to a peer, that overture would be 3 behaviors long, and so on.

The first finding of interest was that length of interactions did not differ by age or age mix; in other words, younger children exchanged in just as many turns or rounds on average, in any given exchange, as did older childfen. Both older and younger children were, therefore, equivalently skilled at maintaining interactions. That may well be because of their substantial previous experience with peers.

However, there were age differences among these peer experienced, familiar children. Some of those differences are shown in the first 2 tables on the handout. The first table shows the length of the children's social overtures, broken down by age mix ("looks" are included because they are the most basic social overture, and are usually taken as a requirement for identifying an initiation or response). In general, both older and younger toddlers tend to use the less complex, shorter overtures in interaction with one another. What should be noted in particular here, however, is the very low frequency among the 18 month olds of the most complex overtures, those composed of 3 behaviors in addition to the look. That finding will come up again in a little different context. In the meantime, the next table shows age differences in the content of the children's social overtures. Specifically, older toddlers used more distal-

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symbolic behavior such as vocalizations and gestures, more imitation, and more positive affect than did the younger children. Similar observations have been made on unfamiliar peers, but these age differences also hold here, for familiar, experienced children. Putting these data together, then, although 18 and 24 month olds are equally proficient at maintaining social interaction with a peer (given peer experience previously), they do differ with respect to both the structure and the content of their interactions, with the 18 month olds using the very few complex social overturnes, and less distal-symbolic communication and imitative behavior.

Before beginning to speculate about possible reasons behind these age differences, I'd like to turn to the next set of results, those dealing with accommodations by the children to their different aged partner in the mixed age setting. Looking at the previous tables, it sould be obvious that we can't really tell what's going on in the mixed age dyads from a dyad level description. In particular, we can't tell if the children are behaving differently in mixed age than in same age interaction. To find that out, it is necessary to look at individual behavior within the dyad. That is pictured in the next 2 figures in the handout. Here the behavior of the 18 and 24 month old is broken down by the age of the child's partner. Looking at the first figure, it can be seen that for the less complex overtures older partners elicited more frequent social overtures. That is, 18 month olds are increasing their initiations and responses in the mixed age setting, while 24 month olds are decreasing. But that is not the case for the longest overtures. Here, the younger children are not adjusting their behavior at all in the mixed age setting--they still very seldom use overtures of this complexity, and their behavior does not differ from that with a same age peer. The 24 month olds, on the other hand, are increasing the frequency of these overtures when they're with an 18 month old partner. For the content of the interaction (next figure), again the younger child increases the frequency of some behaviors when paired with an older partner, namely imitations and positive affect--but not distal-symbolic behaviors. The older children, in contrast, again generally decrease levels of

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behavior with a younger partner. One obvious question is to what extent increases in the younger child's behaviors are simply responses to a more sociable older partner. One way to answer that question is to look at the child's spontaneous initiations to the peer. Those results are not shown here because they look very similar to those for overtures taken as a whole--i.e., the younger child is spontaneously increasing the frequencies of some behaviors in the presence of an older partner. So what's happening here? Both children are modifying their behavior in the mixed age setting relative to the same setting, but they do so differently. The younger child seems to be stimulated to perform at a higher level by an older partner, but within certain limits. Specifically, the 18 month olds adjusted their behavior as a function of partner, but only using less complex overtures. It looks like there might be some sort of ceiling on the number of behaviors the younger toddler can put together into a single overture; 3 behaviors may exceed that limit. The older child, on the other hand, accommodates, in general, to the younger partner, by decreasing the frequency of her social behavior, except for the longest overtures. Here, the 24 month old rather dramatically increases the frequency. So she does not seem to be operating under the same sort of limits on overture length as does the 18 month old, but why should the child increase the frequency of the most complex social overtures? That increase seems rather puzzling at first, especially given Shatz & Gelman's old findings that older partners tend to simplify messages for younger listeners. However, more recently Wellman & Lempers found that 2 year olds increased the length of their messages in difficult communicative contexts. So we may see the something happening here as well--the older child may essentially be "piling on" behaviors to increase the likelihood that the younger child will attend to and respond to his overtures. So the older child may in fact be actively compensating for the younger child's skill level in the mixed age setting, a somewhat remarkable skill in the 24 month old!

Overall, then, there are two conclusions that seem especially interesting.

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First, even during the 2nd year, we see children modifying their social behavior as a function of their partner's sociality. That suggests that even very young children are sensitive to some of the uniquely social aspects of interactional settings, and that they possess a very basic and important social skill--altering their behavior in response to partner characteristics. The second implication I'd like to spend a moment with is the one regarding age differences in the length of the children's social overtures. It was suggested before that there might be a ceiling or limit on the complexity of the 18 month old's initiations and responses, as indexed by the number of discrete behaviors she can integrate into a single overture. This finding is especially interesting when one considers its convergence with some other provocative findings from other developmental domains. Namely, other investigators have described a constraint on the number of behaviors children this age can imitate in a single sequence, also in the number of behaviors or schemes they can combine into a single sequence in pretense/play, or object and in the number of words they can combine into a single utterance. Across these diverse domains, then, we seem to be seeing a common limitation on children's combinatorial abilities. Further, there seems to an age-related transition to longer combinations sometime during the latter ½ of the 2nd year. It seems possible that the constraints that we seem to be observing here may lie in some aspect of the child's information processing system, perhaps an attentional or memory capacity limitation, that changes with age. John Flavell just a year ago in Boston suggested that such a development might indeed underlie those instances where we observe relatively homogeneous change. Thus I would like to suggest that we may have a starting point here for conceptualizing the relations between social and cognitive development in the very young child, allowing us to begin to build an explanatory framework for some of the age-related changes we observe in very young children's peer social skills.

With that, I would like to turn now to the second set of observations on these children--those in which they were observed in cooperative problem solving.

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Here, a slightly different sort of question was being asked--a question about children's understanding of behavioral roles in social intraction, or of complementarity in social exchange, what children of this age understand about the relationships between social partners. The existing literature reports that toddler aged children exchange toys, and play games such as chase or ball with one another, interactions that would seem to require some understanding of behavioral roles. I wanted to elaborate on these preliminary findings, and to get a bit more specific picture of children's understanding of such roles during the same period when we know that their peer skills are advancing, and their understanding of cause-effect relations is undergoing developmental change. So I placed children in a situation that made quite specific demands on that sort of understanding, specifically, a cooperative problem solving setting where the children had to coordinate complementary roles in order to solve a problem. I can make this a little clearer and more concrete by giving you an example from your own everyday experience: when you open a door for someone else who is carrying an armload of groceries, you are doing so on the basis of several fairly complex cognitions about the other person. First, you are aware that the other person's passage is blocked by the door, and that that person has a goal, namely to get by the block. Second, you must be aware that the person's physical circumstances make him incapable of circumventing the barrier. Then you must realize that you are capable of removing the barrier if you act in a manner that is complementary to the activities of the other person, and finally, to do so successfully, you must know to coordinate your behaviors both spatially and temporally with the movements of the other person.

In the cooperative problem solving task encountered by the toddlers, similar kinds of knowledge were required if they were to successfully solve the problem. One of the problems is illustrated on the last page of the handout, and shows a situation where a child must use a simple tool to retrieve a goodie in the cup on the end of the tool. In this case the child must simply push the piston through

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the clear, plexiglass cylinder, and get the lure. But in the cooperative situation, the goal is blocked by a clear barrier; further, the tool is rigged in such a way that the child who operates it must maintain contact with it to keep the lure accessible, out of the cylinder. Thus, the aid of a partner is required either to hold the tool extended, or to retrieve the lure. What the children have to know in this setting is that one child working alone cannot retrieve the lure, i.e., that the goal is blocked for the tool operator. Further, that two of them can solve the problem by assuming particular roles relative to one another--complementary roles. That is, both children cannot be on the same side of the task at the same time--their activities must complement one another, rather than duplicating one another. So they have to know how to coordinate their behavior in both space and time: the child on the receiving end must be there at the same time as the child operating the tool makes the objects available, and the child who operates the tool must hold it for the second child to get the objects out.

The design for this set of observations was the same as for the free play session, with 18 and 24 month same age dyads, and mixed age dyads composed of one of each. The procedure was to remove the children once again to a separate room, but this time they had 15 mins of cooperative problem solving instead of free play. There were two problems, both operating on the same basic principles, and they were counterbalanced for order across subjects. Each problem had two small animals in its cup, and the children were simply told that they could play with the animals if they could get them out. They were then videotaped as they attempted to solve the problems. All problem directed behavior was exhaustively coded using the categories shown on the handout. "Changes to same or opposite side" refers to the children's changes in position relative to one another and the problem--so a child could move to the same side of the problem as the partner, or to the opposite side. "Manipulate + pause" refers to the tool operator's behavior when pushing the tool--a pause of at least 1 sec was necessary for the partner to get the lures from the cup. A "solution" was scored any time the child on the receiving end touched

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the animals in the cup--they didn't have to be actually removed. A "direct-command" was any direction, vocal or gestural, by one partner to the other that was problem related, and typically included things like telling the peer to get the animals or to push the tool. A "displace partner" was coded whenever one child attempted to remove the other child's hand from the tool, or to push the other child bodily away from the tool. "Comply-yield" and "protest-resist" were the possible responses to a direct-command or to an attempt to displace.

What I was looking for here was whether children would adopt complementary roles spatially, by placing themselves opposite one another at the task, as well as temporally, by appropriately timing the behavior of pushing the tool and holding it with the complementary behavior by the other child of retrieving the animals. As you look down this table, you can see, in general, that the younger children are apparently much less capable of either of those than are the older children. Specifically, younger children more often move to the same side of the problem occupied by the partner, instead of to the opposite side, and they further attempt tp displace the partner at her activities. They also simply explore the problem more, and they fail to pause when they're pushing the tool, effectively preventing the partner from getting the goodies, with the result that they also have many fewer solutions per tool manipulation. The picture one gets, then, is of the younger dyads essentially unable to coordinate their behavior, instead following one another about, or working independently. By 24 months, however, the children seem to be much more proficient at adopting and maintaining complementary roles.

Now when we look at mixed age performance here, the means lie either somewhere in the middle between 24 and 18 month old performance, or they look rather like the older dyads. The question that arises, then, is whether the older child is taking over the mixed age interaction, or whether the younger child is spontaneously behaving in a more sophisticated fashion with an older partner. For that we have to look at the individual data, shown in the figure. At the individual level,

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the older child in mixed age interactions looks more like the younger child than when she's with a same age partner--in the mixed age setting, the older child explores more, moves to the same side as the partner more often, and moves proportionately less to the opposite side. The younger child, on the other hand, seems to be behaving more like his older partner than when he's with a same age peer--he explores less, and moves to the complementary position opposite the partner proportionately more often. It looks at first glance, then, as if the younger child has suddenly figured something out about complementary roles when in the presence of an older child. However, additional findings (not shown) suggest that conclusion is probably not warranted. Namely, the older child increased the frequency of directions and commands to a younger partner, and the younger child more often complied with an older child's requests. Thus it may be more accurate to picture this situation as the older child essentially running the show, taking a position at the problem, for example, even if it is initially on the same side of the problem as the younger partner, and then instructing the younger child to behave in the appropriately complementary fashion. In fact, anecdotally, a fairly typical occurrence was for the older child to stand ready at one end and urge the younger child to use the tool or to get the animals by pointing and saying "do it! do it!" or "get it! get it!". These findings, then, suggest that although the 18 month old is capable of maintaining social interaction with a peer in free play, her understanding of the relations between self and other is still quite rudimentary, and undergoes change over the subsequent 6 months, making the 24 month old much more proficient at perceiving the contingencies between her own behavior and that of a partner.

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This data converges rather interestingly with some independent evidence about children's understanding of roles in pretense play. Recent investigations have reported a transition around 20 to 24 months where the toddler comes to recognize that others are independent agents, i.e., that the behavior of others is independent of the toddler's own behavior, and can be autonomously initiated by the other.

In pretense play that gets expressed when the child for the first time gives a spoon to a doll, for example, as if the doll could feed itself. Prior to that time, the child could at first pretend only at his own activities such as pretending to feed himself. He then could generalize that self-centered activity to another recipient, as in pretending to feed a doll, but still would not recognize that others were not only recipients of one's behavior, but were also independent initiators of their own behavior, i.e., were indpendent agents. It is not until 20 to 24 months that that latter awareness seems to emerge. Thus in the cooperative problem solving data, it is possible that we're seeing a similarly based transition. That is, for the children to coordinate complementary roles, they must be aware that their own and their partner's behavior are independently caused, but can be coordinated and mutually regulated. The child must, then, at least at some implicit level, be able to integrate at least 2 sets of causal relations--that between self and object, and that between self and other. Although the 18 month old can do the former, between self and object, it seems he cannot yet do the latter, or perhaps cannot do them both at the same time. Clearly there are many questions left unanswered here, but this data does suggest that we're seeing the beginning of some important social-cognitive sorts of understanding druing the 2nd year that goes hand in hand with growth in interactional skills.

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EFFECTS OF AGE AND AGE-MIX ON TODDLER PEER INTERACTION

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International Conference on Infant Studies, Austin, Texas, 1982

Table 1. Mean dyadic frequency of Social Overtures by Structure

	Young-age	Mixed-age	Old-age
Look only	18.5	18.0	16.7
Look + one behavior	17.3	28.0	31.4
Look + two behaviors	5.6	12.9	16.0
Look + three behaviors	3.3	7.0	6.2

Table 2. Mean dyadic frequency of Social Overtures by Content

	Young-age	Mixed-age	Old-age
Object-mediated	21.7	36.0	29.3
Distal-symbolic	16.2	22.7	38.2
Imitate	4.8	8.9	17.7
Physical/approach	5.8	7.8	6.3
Positive affect	27.5	45.5	69.1
Negative affect	9.1	12.8	9.9

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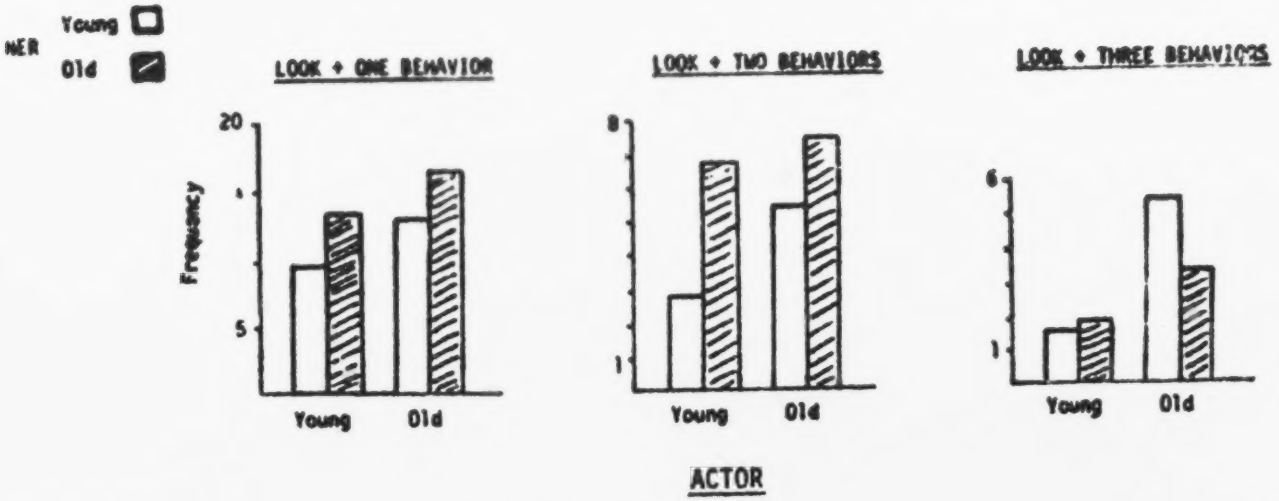

Figure 1. Mean frequency per child for Social Overtures by structure, age of child, and age of partner

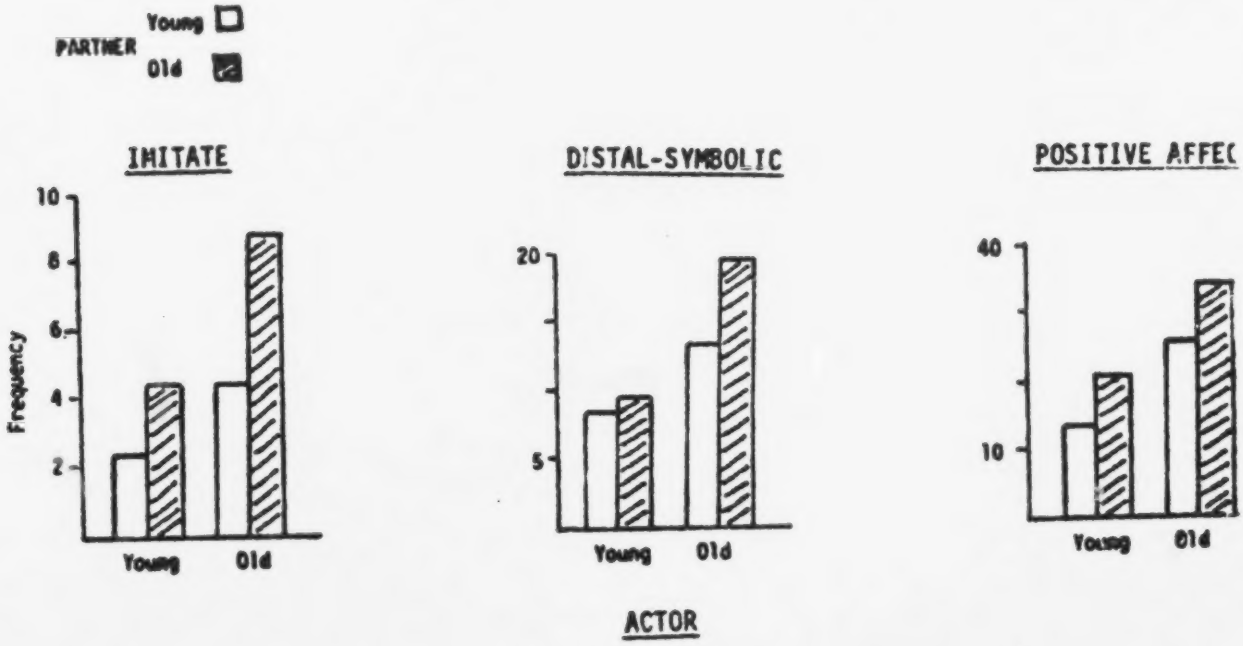

Figure 2. Mean frequency per child of Social Overtures by content, age of child, and age of partner

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Table 1. Mean dyadic frequency per solution attempt of Problem Directed Behaviors

	Young-same	Mixed-age	Old-same
Change sides to same side	21.6	24.8	12.8
Change sides to opposite side	13.8	26.8	26.4
Proportion of changes to same side	.61	.48	.33
Proportion of changes to opposite side	.39	.52	.67
Explore apparatus	6.0	5.0	3.6
Manipulate + Pause per total manipulates*	.15	.35	.76
Solutions per total manipulates*	.21	.55	.85
Solution, given Direct-Command*	.13	.61	.82
Direct-Command	.40	.88	.60
Displace partner	1.38	1.08	.46
Comply-yield to partner	1.06	.90	.76
Protest-resist	.26	.34	.08

*Proportions

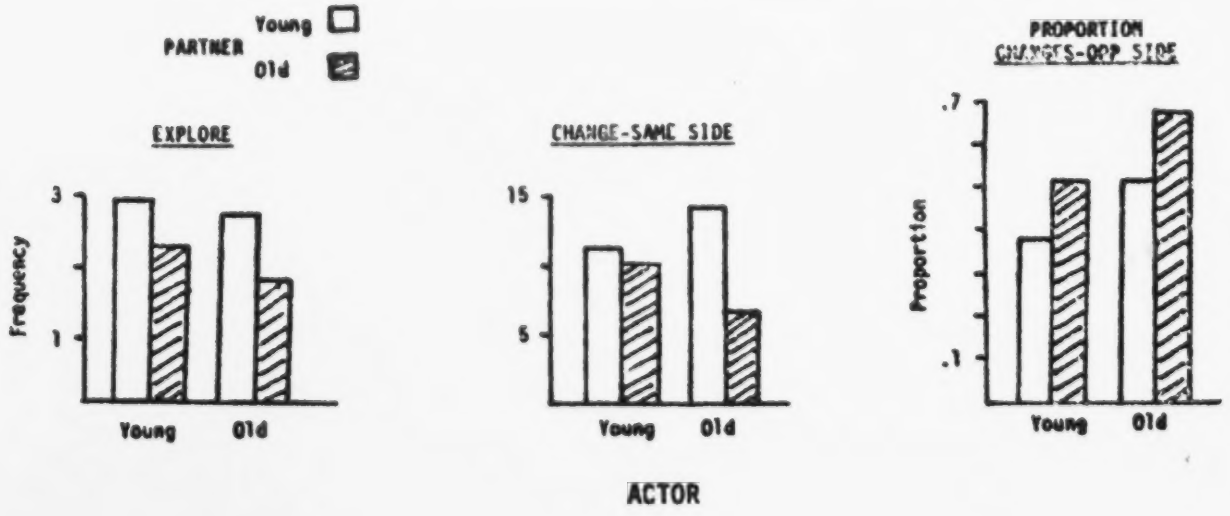

Figure 1. Mean frequency per child for Problem Directed behaviors on Cooperative Pro
by Age of Child and Age of Partner

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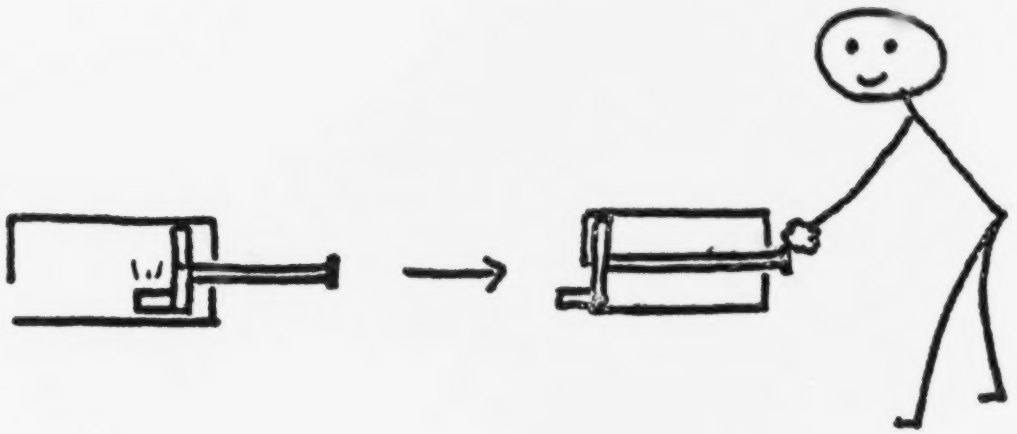

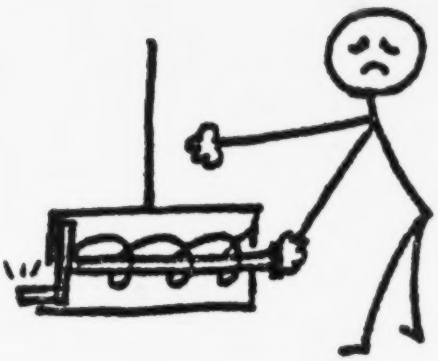

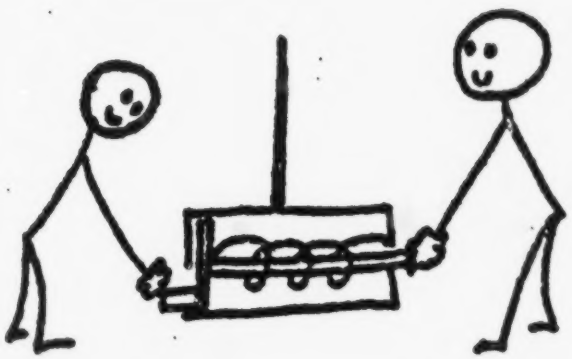

COOPERATIVE PROBLEM-SOLVING

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